DEPARTMENT OF MINES AND RESOURCES

BUREAU OF MINES

CANADA

Ottawa, September 22, 1949.

R E P O R T

of the

MINERAL DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 2591.

Laboratory Experiments on Selective Flotation of a Sample of Current Mill Feed from the Property of United Keno Hill Mines, Limited, Mayo, Yukon Territory.

Note:
This report relates essentially to the samples as received. It shall not, nor any correspondence connected therewith, be used in part or in full as publicity or advertising matter for the sale of shares in any promotion.

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BUREAU OF MINES

Division of
Mineral Dressing
and
Process Metallurgy

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OF
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MINES, FORESTS AND SCIENTIFIC
SERVICES BRANCH

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Shipment and Instructions:

On May 10, 1949, a sample consisting of two bags of ore of a net weight of 191 pounds was received at the Laboratories. This represented current mill feed at the property of United Keno Hill Mines Limited, Mayo, Yukon Territory.

This sample is one of a series of shipments which have been forwarded to the Bureau of Mines' laboratories for test purposes and upon which reports have been written. (See Report of Investigation No. 2400, April 8, 1948.)

Correspondence from Mr. W. G. Hubler, representing the United Keno Hill Mines, Limited, under date of May 17, 1949, explained the test work requirements on this sample. He stated that considerable work had been done at the mine on selective flotation of the lead, zinc and silver values in the ore with encouraging results. He asked that a few tests on selective flotation be carried out in the Bureau of Mines' laboratories and one or two tests on cyaniding the test tails after flotation of the oxidized lead.

Location of Property:

The property of United Keno Hill Mines, Limited, from which the sample originated, is situated approximately in the centre of the Yukon Territory at Mayo.

Sampling and Analysis:

The sample, as received, consisted of apparently crushed rock suitable for mill feed. It was reduced to approximately 14 mesh and a head sample cut out on a Jones sampler for assay and analysis. The remainder, to be used for investigative purposes, was screened through a 14 mesh screen and bagged.

A small portion of the head sample was submitted to the Spectrographic Laboratory for the examination of the concentration of elements, and gave the following results in order of their concentration.

(1) Silicon.

(2) Iron, manganese.

(3) Lead, silver, magnesium, zinc.

(4) Antimony, arsenic, aluminium, copper.

(5) Boron, nickel, titanium.

A quantitative analysis of the head sample gave the following results:

Silver	-	50.0 oz./ton
Lead	-	7.04 per cent
Zinc	-	4.53 "
Copper	-	0.20 "
Manganese	-	5.74 "
Iron	-	14.05 "
Sulphur	-	4.16 "
Insoluble	-	42.76 "
Tin	-	None detected.

Test Observations:

Visual examination of the sample showed it to be greatly oxidized and conforming generally in appearance to previous samples of ore from this property.

Analysis revealed the usual presence of manganese in considerable quantity, requiring careful procedure in the zinc analysis.

Lead, zinc and silver values were somewhat higher than in the sample covered by Report No. 2400 on ore from this property.

A screen analysis of the head sample was made and showed the following relation of silver to the other metals in the ore:

Mesh Size	Weight, per cent	Assays					Distribution, per cent				
		Oz/ton	Per Cent								
		Ag	Pb	Zn	Fe	S	Ag	Pb	Zn	Fe	S
On 28	17.9	36.96	5.80	4.04	13.99	4.11	12.8	14.3	18.8	18.8	16.2
" 35	13.2	46.44	8.10	3.84	13.70	5.14	11.9	14.8	13.2	13.5	15.6
" 48	10.0	49.60	7.94	4.58	13.55	5.19	9.7	10.9	11.9	10.2	11.9
" 65	8.1	54.06	8.40	5.05	13.94	5.54	8.5	9.3	10.6	8.5	10.2
" 100	7.1	57.84	8.46	4.68	13.60	5.55	8.0	8.2	8.7	7.2	9.1
" 150	9.0	56.82	8.02	4.15	12.05	4.94	9.9	9.9	9.7	8.2	10.2
" 200	7.3	49.98	6.34	3.58	11.10	3.61	7.1	6.3	6.9	6.0	6.2
Through 200	27.4	60.36	6.99	2.84	13.45	3.29	32.1	26.3	20.2	27.6	20.6
Totals	100.0	51.50	7.28	3.84	13.34	4.38	100.0	100.0	100.0	100.0	100.0

This screen analysis reveals no important changes in the mineral associations from previous samples from this property. The silver values are reasonably proportionate to the lead values except in the minus 200 mesh fraction.

Test Procedure:

In previous test work on this ore, the general procedure in flotation which gave satisfactory results, was to float the primary lead with secondary flotation of the oxidized lead and finally the zinc. This seemed to be the logical sequence.

Mr. Hubler stated that test work at the mine followed the sequence of floating the primary lead, then the zinc and finally the oxidized lead.

Several tests were made on this sample following both procedures and results are given for comparison.

As requested, cyanidation tests were conducted on the flotation tailing from several tests.

Microscopic Examination:

Six polished sections were prepared from the sample and were examined under a reflecting microscope for the purpose of determining the character of the ore.

Metallic Minerals -

When viewed megascopically the polished sections do not appear to be so severely oxidized as did those made from the previous (Hector Mine) sample received from this company. Only one of the six polished surfaces shows deep rusty brown stains of iron oxides and only one bears heavy metallic mineralization. It appears to be composed entirely of massive galena; the remainder exhibit small grains of metallics sparingly scattered through gangue. The microscopic examination substantiates the observations made with the unaided eye.

Galena, the most abundant metallic mineral, is largely massive but a small amount is disseminated through gangue as medium coarse to very fine uneven grains. The section of massive galena encloses a few small inclusions of sphalerite and gangue. Light etching of the polished surfaces in several places with 1:1 HNO_3 reveals tiny inclusions somewhat like Schneiderhohn's "silver-carriers" but they are not so conspicuously oriented along crystallographic directions in the galena as he depicts them.© (See Fig. 1.)

Sphalerite, the next most abundant metallic, is visible

© Schneiderhohn - Ramdohr, Lehrbuch der Erzmikroskopie, II Band, pages 252-3.

in gangue as coarse to fine irregular grains containing rare small inclusions of pyrite and gangue.

Pyrite is present in relatively small quantity as medium coarse to fine irregular grains scattered sporadically through gangue, rarely in the ore minerals.

As already mentioned, "limonite" stains the gangue of one section deep brown and is visible also as rare small ragged particles in gangue.

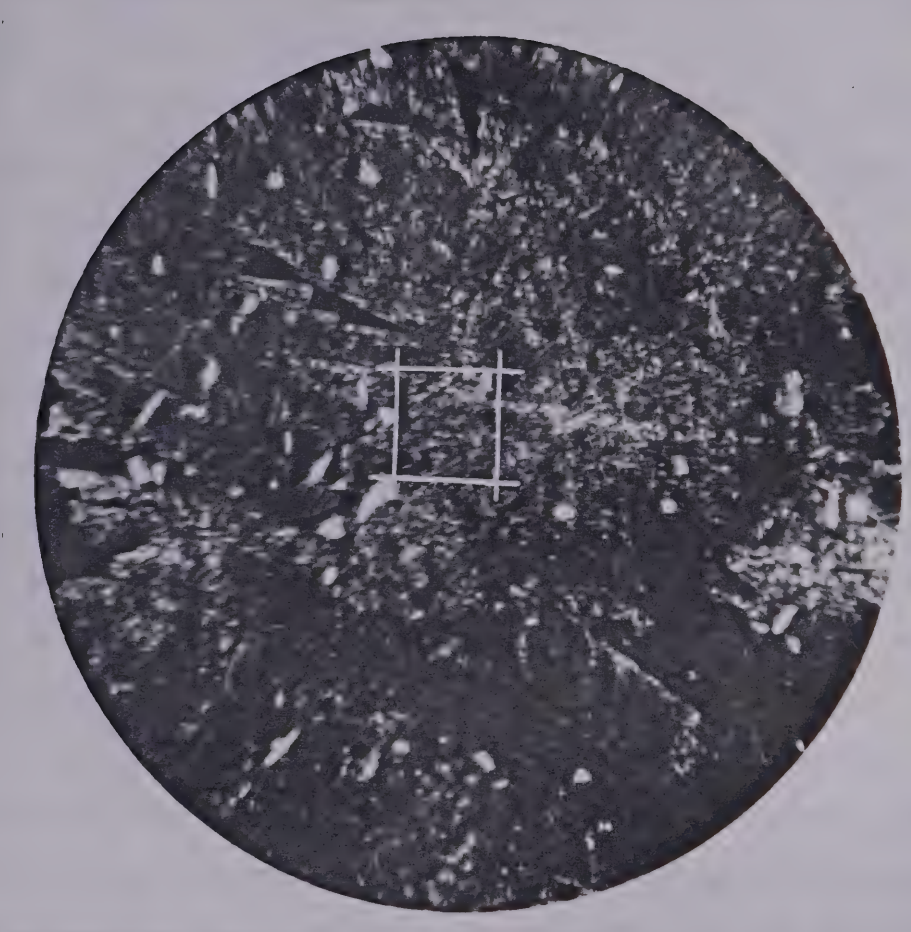
Chalcopyrite was seen in only one section as rare tiny grains in gangue frequently associated with galena.

Gangue -

As represented in the polished sections gangue material is an assemblage of white to grey quartz, hard dark grey rock, and creamy white carbonate. From its reactions to a drop of 1:1 HCl, the latter is probably dolomitic in character.

(Figure 1 follows, on Page 7.)

Fig. 1.



Photomicrograph showing tiny inclusions (white) in galena, (dark) by etching with 1:1 HNO_3; the inclusions are very similar to those called "silver-carriers", probably argentite, by Schneiderhohn but are not intercalated so prominently along crystallographic directions in the galena as are his; pits are black and the white square represents a 200-mesh Tyler screen opening; 200 X; reflected light.

Conclusions from Investigative Tests:

Tests Nos. 4 and 6 were conducted following the suggestions of Mr. Hubler and Tests Nos. 5 and 7 followed the procedure as carried out in previous test work on this ore at the Bureau of Mines' laboratories.

Lower tailing loss from flotation of silver resulted from Tests Nos. 5 and 7 than from Tests Nos. 4 and 6, with lead and zinc tailing loss about equal.

This tailing loss in silver from flotation is not of primary importance as minimum loss in this metal can only be obtained by cyanidation of the flotation tailing. The flotation tailing, as was the case in previous test work, appears to be quite amenable to cyanidation after removal of the lead and zinc as a concentrate. The cyanide tailing is practically the same in Test Nos. 4, 5, 6 and 7 where this procedure was carried out.

Fair recoveries of the silver, lead and zinc are obtained by either sequence of flotation with acceptable grades of concentrates. Maximum recoveries of these three metals are shown when two or three of the test concentrates are combined.

In conclusion, it may be stated that the ore yields itself to selective flotation with the procedure to be adopted depending on certain economic factors, including smelter contracts, freight charges, operating costs, and capital expenditure.

DETAILS OF INVESTIGATIVE TESTS:

Test No. 1.

This test was made as a preliminary one to indicate where the different metals would report in the concentrate and to give some idea as to the time of flotation required.

2,000 gm. of ore was ground to 84.8 per cent minus 200 mesh and transferred to a flotation cell with the following reagents.

Reagents Added:

	Float No. 1		Float No. 2	
To Grinding -	Lb./ton ore			Lb./ton ore
Soda ash	- 2.5			
Pot. Amyl xanthate	- 0.1			
Reagent No. 404	- 0.1			
Aerofloat No. 31	- 0.035			
Sodium phosphate	- 1.5			
Conditioning	(4 min.)	pH 8.1.		(4 min.)
$ZnSO_4$	- 0.5		Reagent No. 404	- 0.1
NaCN	- 0.3		Pot. amyl. xanthate	- 0.1
			Na_2S	- 2.0
			Soda Ash	- 2.0
			$CuSO_4$	- 1.0
Flotation -				
Pine oil	- 0.075		Pine oil	- 0.025

No. 1 concentrate was taken off for 3½ minutes. No. 2 concentrate was removed for 5½ minutes and No. 3 concentrate was completed after 7 minutes.

(Results, Test No. 1, follow on Page 10.)

Results, Test No. 1:

Product	Weight, per cent	Assays					Distribution, per cent				
		Oz./ton	Per Cent								
		Ag	Pb	Zn	Fe	S	Ag	Pb	Zn	Fe	S
No. 1 Flot. Conc.	8.1	358.22	54.47	17.72	6.17	14.82	56.9	60.3	26.0	3.7	31.3
No. 2 Flot. Conc.	5.2	197.64	11.10	37.91	7.97	19.12	20.1	7.9	49.9	3.1	26.0
No. 3 Flot. Conc.	6.6	57.90	12.52	11.36	16.48	10.01	7.5	11.3	18.9	8.1	17.2
Flot. tailing	80.1	9.84	1.87	0.26	14.24	1.21	15.5	20.5	5.2	85.1	25.5
Total	100.0	50.99	7.31	3.96	13.47	3.82	100.0	100.0	100.0	100.0	100.0

Test No. 2.

This test was a bulk flotation test to give some idea of the tailing loss to be expected from this sample. A previous sample of ore from the Hector Mine, submitted by the United Keno Hill Mines revealed a considerable quantity of the secondary lead mineral anglesite, which did not yield well to flotation.

2,000 gm. of ore was ground to 84 per cent minus 200 mesh and transferred to a flotation machine and floated under the following conditions.

Reagents Added:

To Grinding -

		Lb./ton ore
Soda ash	-	3.5
Pot. amyl xanthate	-	0.1
Reagent No. 404	-	0.1
Aerofloat No. 31	-	0.035
Na_3PO_4	-	1.5
Na_2S	-	2.0

To Conditioning pH, 8.3. (4 min.)

$CuSO_4$	-	1.0

To Flotation -

Pine oil	-	0.075 (16 min.)

(Results, Test No. 2, follow on Page 12.)

Results, Test No. 2:

Product	Weight, per cent	Assays					Distribution, per cent				
		Oz./ton	Per Cent								
		Ag	Pb	Zn	Fe	S	Ag	Pb	Zn	Fe	S
Flot. conc.	17.5	243.62	30.35	16.41	11.55	19.27	82.42	70.4	70.3	15.0	78.8
Flot. tailing	82.5	11.02	2.70	1.47	13.94	1.10	17.58	29.6	29.7	85.0	21.2
Totals	100.0	51.72	7.53	4.08	13.52	4.28	100.0	100.0	100.0	100.0	100.0

Test No. 3.

2,000 gm. of ore was ground to 84.2 per cent minus 200 mesh and transferred to a flotation machine and floated in three stages, with three concentrates produced under the following conditions:

REAGENTS ADDED:

	Float No. 1.	Float No. 2.	Float No. 3
To Grinding -			
	Lb./ton ore	Lb./ton ore	Lb./ton ore
Soda ash -	2.5		
Pot. amyl xanthate -	0.1		
Reagent No. 404 -	0.1		
Aerofloat No. 31 -	0.035		
Na_3PO_4 -	1.5		
NaCN -	0.3		
$ZnSO_4$ -	0.5		
To Conditioning (pH, 8.1)		To Conditioning (4 min.)	To Conditioning (4 min)
		Reagent No. 404 - 0.1	$CuSO_4$ - 1.0
		Pot. amyl xanthate - 0.1	$Ca(OH)_2$ - ?.5
		Na_2S - 2.0	Reagent No. 226 - 0.2
		Soda ash - ?.0	Pot. amyl xanthate - 0.1
To Flotation (3½ min.)		To Flotation (5½ min.)	To Flotation (7 min.)
Pine oil -	0.05	Pine oil - 0.05	Pine oil - 0.025

The concentrate from Float No. 2 was cleaned with 0.5 pound $ZnSO_4$ per ton of ore, 0.3 pound NaCN and 1.5 pounds Na_2SiO_3 for a period of 5 minutes.

No. 3 Concentrate was cleaned with 1.5 pound Na_2SiO_3 per ton of ore for 5 minutes.

(Results, Test No. 3. follow on Page 14.)

Results, Test No. 3:

Product	Weight, per cent	Assays					Distribution, per cent				
		Oz./ton	Per Cent								
		Ag	Pb	Zn	Fe	S	Ag	Pb	Zn	Fe	S
No. 1 Conc.	9.0	373.72	54.2	11.78	5.48	17.75	65.0	67.4	27.3	3.7	32.2
No. 2 Cleaner Conc.	1.9	276.62	56.48	8.36	4.28	6.73	10.4	14.9	3.9	0.6	2.6
No. 2 Cleaner Tailing	2.5	84.84	5.04	18.08	16.63	11.52	4.4	1.7	11.5	3.1	5.8
No. 3 Cleaner Conc.	4	63.4	3.25	30.45	11.30	30.47	3.0	2.3	50.0	5.6	33.5
No. 3 Cleaner Tailing	9.4	19.54	2.11	0.74	16.63	1.15	3.6	2.7	1.8	11.7	2.2
Flot. tailing	70.8	6.24	1.06	0.30	14.24	1.31	8.6	10.5	5.5	75.3	13.7
Total	100.0	51.32	7.23	3.90	13.39	4.96	100.0	100.0	100.0	100.0	100.0

Test No. 4.

2,000 gm. of ore was ground to 85.0 per cent minus 200 mesh and transferred to a flotation machine and floated under the following conditions. Three concentrates were produced in the order of primary lead, zinc and oxidized lead.

REAGENTS ADDED:

Float No. 1	Lb./ton ore	Float No. 2	Lb./ton ore	Float No. 3	Lb./ton ore
To Grinding -					
$Ca(OH)_2$	2.0				
NaCN	0.2				
$ZnSO_4$	1.0				
Aerofloat No. 31	0.075				
To Conditioning (pH, 8.1)		**To Conditioning (3 min.)**		**To Conditioning (3 min.)**	
		$CuSO_4$	0.5	Na_2SiO_3	2.0
		Reagent No. 343	0.05	$CuSO_4$	0.6
				Reagent No. 301	0.1
				Na_2S	4.5
To Flotation (15 min.)		**To Flotation (7 min.)**		**To Flotation (12 min.)**	
Cresylic acid	0.1	Pine oil	0.06	Pine oil	0.08
Cleaner Cell (6 min.)		**Cleaner Cell Conditioning (30 min.)**		**Cleaner Cell (6 min.)**	
Na_2SiO_3	1.0	$ZnSO_4$	2.0	Na_2SiO_3	1.0
		Na_2SO_3	2.0		
		NaCN	2.0		
		Flotation (10 min.)			
		Reagent No. 343	0.04		
		Cresylic acid	0.04		

(Results, Test No. 4, follow on Page 16.)

Results, Test No. 4:

Product	Weight, per cent	Assays					Distribution, per cent				
		Oz./ton	Per Cent								
		Ag	Pb	Zn	Fe	S	Ag	Pb	Zn	Fe	S
No. 1 Cleaner Conc.	5.2	430.58	79.02	1.26	2.39	13.82	44.5	60.8	1.7	0.9	16.1
No. 1 Cleaner Tailing	2.2	480.90	29.10	6.99	11.50	9.70	21.3	9.4	3.9	1.9	4.8
No. 2 Cleaner Conc.	4.2	163.70	7.37	41.34	8.76	26.07	13.6	4.6	44.0	2.9	24.6
No. 2 Cleaner Tailing	5.9	17.70	1.84	28.66	17.93	27.08	2.0	1.6	42.3	8.2	35.9
No. 3 Cleaner Conc.	2.5	95.60	39.19	1.74	9.91	2.49	4.7	14.5	1.1	1.9	1.4
No. 3 Cleaner Tailing	1.8	25.30	3.79	1.16	18.42	3.57	0.9	1.0	0.5	2.5	1.5
Flot. tailing	78.2	3.39	0.70	0.30	13.50	0.89	13.0	8.1	6.0	81.7	15.7
Total	100.0	50.29	6.76	3.94	12.94	4.44	100.0	100.0	100.0	100.0	100.0

500 gm. of flotation tailing was cyanided for 72 hours at 2 to 1 dilution. The solution was maintained at 4 lb./ton of NaCN and 2 lb./ton of CaO.

Results:

Flotation tailing, oz./ton silver	= 8.39
Cyanide " " "	= 2.37
Per cent extraction, silver	= 71.8
Additional extraction on ore by cyaniding flotation tailing, per cent silver	= 9.3
NaCN consumed, lb./ton tailing	= 4.16
CaO " " "	= 23.12

Test No. 5.

2,000 gm. of ore was ground to 83.2 per cent minus 200 mesh and transferred to a flotation machine with the following reagents added, and the ore floated under the following conditions.

REAGENTS ADDED:

To Grinding -	Float No. 1 Lb./ton ore	Float No. 2 Lb./ton ore	Float No. 3 Lb./ton ore
Soda ash	- 2.0		
Pot. amyl xanthate	- 0.1		
Reagent No. 404	- 0.1		
Aerofloat No. 31	- 0.07		
Na_3PO_4	- 1.5		
NaCN	- 0.3		
$ZnSO_4$	- 1.0		

Float No. 1		Float No. 2		Float No. 3	
	Lb./ton ore		Lb./ton ore		Lb./ton ore
To Conditioning (pH, 8.0)		To Conditioning (5 min.)		To Conditioning (5 min.)	
		Reagent No. 404	- 0.1	Pot. amyl xanthate	- 0.1
		Pot. amyl xanthate	- 0.1	$CuSO_4$	- 1.0
		Na_2S	- 2.0	$Ca(OH)_2$	- 2.5
		Soda ash	- 1.0	Reagent No. 226	- 0.15
		NaCN	- 0.3	Sod. Aero-float B	- 0.15
		$ZnSO_4$	- 1.0	Na_2SiO_3	- 1.5
To Flotation (5 min.)		To Flotation (15 min.)		To Flotation (12 min.)	
Cresylic acid	0.1	Pine oil	- 0.025	Pine oil	- 0.05
		Cleaner Cell (Cond. 10 min.) (Flot. 5 min.)		Cleaner Cell (Cond. 5 min.) (Flot. 6 min.)	
		$ZnSO_4$	- 1.0	Na_2SiO_3	- 1.5
		NaCN	- 0.3		
		Na_2SiO_3	- 1.5		
		Na_2SO_3	- 1.0		

(Results, Test No. 5, follow on Page 19.)

Results, Test No. 5:

Product	Weight, per cent	Assays					Distribution, per cent				
		Oz./ton	Per Cent								
		Ag	Pb	Zn	Fe	S	Ag	Pb	Zn	Fe	S
No. 1 Conc.	9.6	363.92	50.4	13.46	6.97	18.18	68.4	68.1	32.4	4.9	38.7
No. 2 Cleaner Conc.	3.9	199.16	29.26	11.20	12.15	8.1	15.2	16.1	10.9	3.5	7.0
No. 2 Cleaner Tailing	6.8	10.72	5.09	6.0	18.72	4.57	1.4	4.8	10.1	9.5	7.0
No. 3 Cleaner Conc.	7.1	41.99	1.68	22.24	16.13	22.69	5.8	1.7	40.0	8.5	35.7
No. 3 Cleaner Tailing	4.1	27.70	1.68	1.06	15.64	1.32	2.3	0.9	1.1	4.8	1.6
Flot. tailing	68.5	5.17	0.87	0.33	13.5	0.66	6.9	8.4	5.5	63.3	10.0
Total	100.0	51.09	7.11	3.98	13.44	4.51	100.0	100.0	100.0	100.0	100.0

500 gm. of flotation tailing was cyanided for 72 hours at 2 to 1 dilution. The solution was maintained at 4.0 lb./ton of NaCN and 2.0 lb./ton of CaO.

Results:

Flotation tailing, oz./ton silver	=	5.17
Cyanide " " "	=	1.97
Per cent extraction, silver	=	61.9
Additional extraction of silver by cyaniding flotation tailing, per cent	=	4.3
NaCN consumed, lb./ton tailing	=	2.16
CaO " " "	=	20.16

Test No. 6.

This test was a duplicate of Test No. 4 in the primary operations with the same reagent combinations and the same time of flotation. The difference from Test No. 4 lies in the cleaning stages. Nos. 1 and 2 Concentrates were not cleaned and No. 3 Concentrate was cleaned with 1.0 lb. Na_2SiO_3, 0.2 lb. NaCN and 0.5 lb. $ZnSO_4$ per ton of ore.

(Results, Test No. 6, follow on Page 21.)

Results, Test No. 6.

Product	Weight, per cent	Assays					Distribution, per cent				
		Oz./ton	Per Cent								
		Ag	Pb	Zn	Fe	S	Ag	Pb	Zn	Fe	S
No. 1 Conc.	6.8	437.7	61.38	3.01	6.20	12.71	58.1	61.6	4.7	3.0	20.1
No. 2 Conc.	9.8	114.4	7.06	37.83	17.00	28.19	21.9	10.2	34.5	11.8	63.9
No. 3 Cleaner Conc.	2.3	87.6	23.22	1.26	12.50	1.24	3.9	9.6	0.6	2.0	0.6
No. 3 Cleaner Tailing	2.1	27.44	3.32	1.31	17.90	1.16	1.2	1.1	0.6	2.6	0.5
Flot. tailing	79.0	9.71	1.51	0.53	14.30	0.81	14.9	17.5	9.6	80.6	14.9
Total	100.0	51.22	6.77	4.38	14.05	4.32	100.0	100.0	100.0	100.0	100.0

1,000 gm. of flotation tailing was cyanided under conditions as outlined in Tests Nos. 4 and 5.

Results:

Flotation tailing, oz./ton silver	=	9.71
Cyanide tailing, " "	=	2.27
Per cent extraction, silver	=	76.6
Additional extraction on ore by cyaniding flot. tailing, per cent silver	=	11.4
NaCN consumed, lb./ton tailing	=	4.48
CaO " , " "	=	32.56

Test No. 7.

2,000 gm. of ore was ground to 83.7 per cent minus 200 mesh and floated as follows:

REAGENTS ADDED:

	Float No. 1	Float No. 2	Float No. 3
	Lb./ton ore	Lb./ton ore	Lb./ton ore
To Grinding -			
$Ca(OH)_2$	2.0		
NaCN	0.5		
$ZnSO_4$	1.0		
Aerofloat No. 31	0.075		
To Conditioning (pH, 8.5)			
To Conditioning (5 min.)			
Reagent No. 404	0.1		
Reagent No. 301	0.1		
Na_2S	4.5		
Na_2SiO_3	2.0		
NaCN	0.3		
$ZnSO_4$	1.0		
To Conditioning (5 min.)			
$Ca(OH)_2$		1.0	
$CuSO_4$		1.0	
Reagent No. 343		0.15	
Sod. Aerofloat B		0.15	
Na_2SiO_3		1.5	
Reagent No. 226		0.1	

Float No. 1	Lb./ton ore	Float No. 2	Lb./ton ore	Float No. 3	Lb./ton ore
To Flotation (15 min.)		To Flotation (10 min.)		To Flotation (7 min.)	
Cresylic acid	0.1	Pine oil	0.025	Pine oil	0.05
		Cleaner Cell (4 min.)		Cleaner Cell (4 min.)	
		Na_2SiO_3	1.5	Na_2SiO_3	1.0
		$ZnSO_4$	1.0	Na_2SO_3	1.0
		NaCN	0.3		

(Results, Test No. 7, follow on Page 24.)

Results, Test No. 7:

Product	Weight, per cent	Assays					Distribution, per cent				
		Oz./ton	Per Cent								
		Ag	Pb	Zn	Fe	S	Ag	Pb	Zn	Fe	S
No. 1 Conc.	6.7	436.18	60.18	2.86	6.70	12.41	56.4	55.5	4.7	2.8	19.3
No. 2 Cleaner Conc.	3.4	289.84	47.98	9.60	7.60	10.63	19.0	22.5	8.0	1.5	8.3
No. 2 Cleaner Tailing	4.6	46.90	6.35	8.54	18.60	5.61	4.1	4.0	9.7	5.2	6.0
No. 3 Cleaner Conc.	5.8	71.72	1.21	47.92	8.30	27.49	8.0	1.0	68.6	2.9	37.0
No. 3 Cleaner Tailing	3.6	26.28	2.47	1.75	8.10	3.94	1.8	1.2	1.5	1.8	3.3
Flot. tailing	75.9	7.29	1.51	0.39	18.50	1.48	10.7	15.8	7.5	85.8	26.1
Total	100.0	51.91	7.26	4.04	16.37	4.31	100.0	100.0	100.0	100.0	100.0

1,000 gm. of flotation tailing was cyanided under conditions of previous tests.

Results:

Flotation tailing, oz./ton silver	=	7.29
Cyanide " " "	=	2.22
Per cent extraction, silver	=	69.6
Additional extraction on ore by cyaniding flot. tailing, per cent silver	=	7.44
NaCN consumed, lb./ton tailing	=	4.48
CaO " " "	=	32.56

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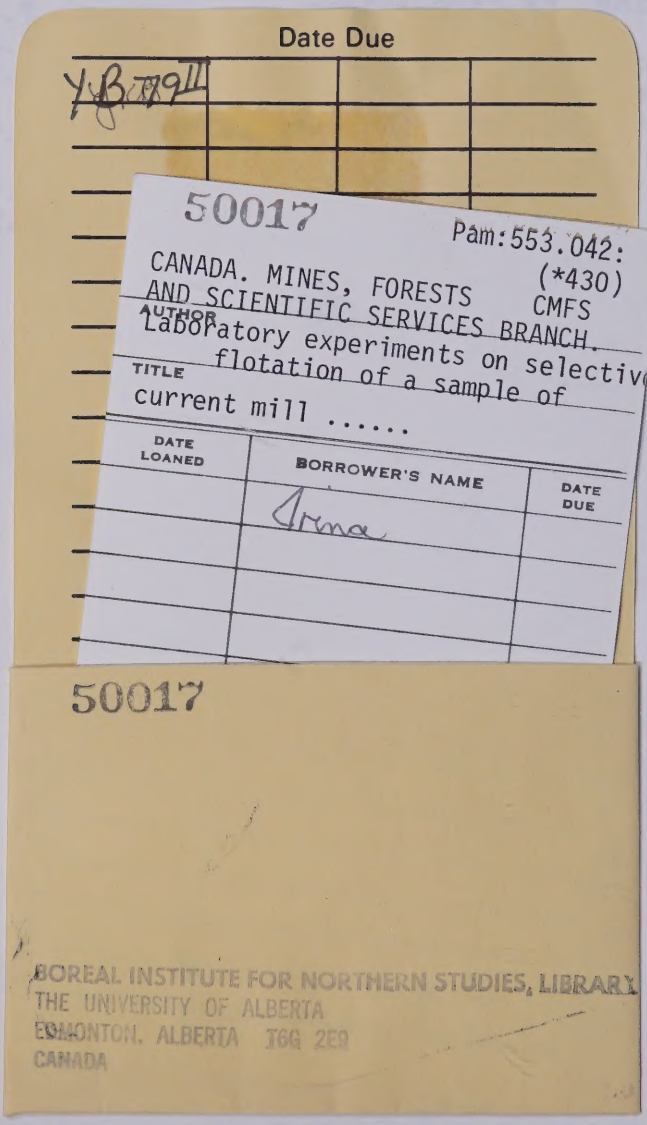
WH:LB.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AUTHOR
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